ELTRAC
meters with purpose

USER MANUAL

mini Series

(AC Range)

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This User Manual includes programming and operating instructions and should be passed on to the end user along with the Password(s) setup.

Dear Customer,

We thank you for choosing an ELTRAC product.

The Nano series of instruments cover very basic electrical parameters - Single Channel Voltage and Current, but with the flexibility and options not available with any other brands.

To fully appreciate your ELTRAC meter, we suggest that you take time to study this handbook. We at ELTRAC stand behind each and every meter that we sell. In case you require any clarifications regarding your ELTRAC meter, you can contact the dealer from whom you purchased the Unit or the nearest dealer. You could also contact our customer support team at the contact number provided at the bottom of this page.

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Every effort has been made to make this manual as comprehensive, easy to understand and accurate as possible. This manual does not purport to cover all details or variations in the models. This manual does not cover all contingencies that may arise in connection with the installation and operation of this unit. Should further information be desired or situations arise that require clarifications, please contact ELTRAC. ELTRAC also welcomes any comments and suggestions that may enhance the utility of this manual. You can contact ELTRAC at:

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IMPORTANT INSTRUCTIONS

This Unit is meant to be installed on electrical panels for measurement / analysis / control of electrical parameters. It should be installed only by qualified, competent personnel who have the appropriate training and experience with high voltage and current devices.

	DANGER
	Failure to observe the following instructions may result in serious injury or death

- During normal operation of the Unit, hazardous voltages are present on its terminal strips. Follow standard safety precautions while performing any installation or servicing work (i.e. removing PT fuses, shorting CT secondaries, etc.)
- Voltage inputs including auxiliary supply must be protected by fuses in each circuit.
- Under no circumstances should the current input to the Unit be disconnected while current is flowing in the primary circuit of the Current Transformer on the line.
- The rear panel of the Unit lists the voltage and current limits that may be applied to various terminals. Application of inputs beyond these limits may result in permanent damage to the Unit and will render the warranty void.
- Ensure that you use the appropriate tools for the mounting the Unit and establishing the connections. The Unit is provided with Screw type Terminal Blocks. The terminals blocks will accept cables between 0.5 to 2.5 mm2. The terminal block screw is of M3 size. Use a flat screwdriver with tip width not exceeding 5 mm to loosen or tighten the screw. Use of oversized screwdriver may damage the terminal block and render the warranty void.

DANGER	This symbol indicates the presence of dangerous voltages within and outside the product enclosure that may constitute a risk of electrical shock, serious injury or death to persons if proper precautions are not followed

CAUTION	This symbol alerts the user to presence of hazards that may cause minor or moderate injury to persons, damage to property or damage to the unit itself, if proper precautions are not followed.

	DANGER
	This unit contains hazardous voltages. The use of unauthorized parts in the repair of the instrument or modification by unqualified personnel may result in dangerous conditions that can cause death, serious injury or property damage.

1. INTRODUCTION

1.1. ELTRAC's Nano Series for the AC range provide a comprehensive range of models covering the basic electrical parameters – Voltage, Current, Frequency and RPM. This range is aimed at applications requiring monitoring of the health of an electrical system.

1.2. COMPREHENSIVE RANGE : There are 7 models to choose from in this range. Model ET-2116 provides a unique feature that enables the user to choose and configure the meter either as a Voltmeter or an Ammeter. This unique feature will be of great significance to large users of meters such Electrical Panel Manufacturers or Original Equipment Manufacturers (OEMS). They need not worry about the break-up of the meters between Voltmeters and Ammeters at the time of ordering. They can order this model in bulk and configure them as Voltmeters or Ammeters as they are being wired into the panels. Model ET-2121 provides both Voltage and Current readings. Model ET-2131 provides Voltage, Current and Frequency in a single unit.

1.3. HIGH ACCURACY : High accuracy is built into each model in this range. The voltage and current values are based on True RMS computation. This method of computation provides a more accurate value in applications where the wave forms are distorted or non-sinusoidal.

1.4. SLIM AND COMPACT : The Nano AC series of meters are housed in a very compact panel mounting case. The meter has a bezel of 96 x 96 mm and requires a standard 90 x 90 mm cut-out. The meter has a depth of a mere 28 mm behind the panel. The slide and lock side clamps allow for easy and quick installation of the meter in the panel. The screw type terminals provide a firm connection of the voltage and current cables. The voltage input terminals are rated for 450 V and the current input terminals are rated for 20 A.

1.5. EASY INTERACTION : The meters display the readings by means of a crisp and bright 7 segment display. This allows the user to view the readings even from a distance thus avoiding the need to approach the meter for this purpose. The meter is completely user configurable and programmable for all electrical systems. The voltage and current ratios can be set through a single smart key provided on the front panel of the meter.

2. UNPACKING

2.1. Examine the Unit before you start the installation. Ensure that there are no signs of damage during transportation. Please read the ELTRAC's Warranty Certificate in Appendix - K

2.2. Examine the voltage, current and power supply ratings marked on the Unit are in accordance with your requirement and match the ratings on the panel on which the Unit will be installed.

2.3. The Unit does not require an earth connection.

3. UNDERSTANDING YOUR INSTRUMENT

3.1. Front View of your Unit

(1) Parameter Value Display Window : displays the value of the parameter. Refer para 7.

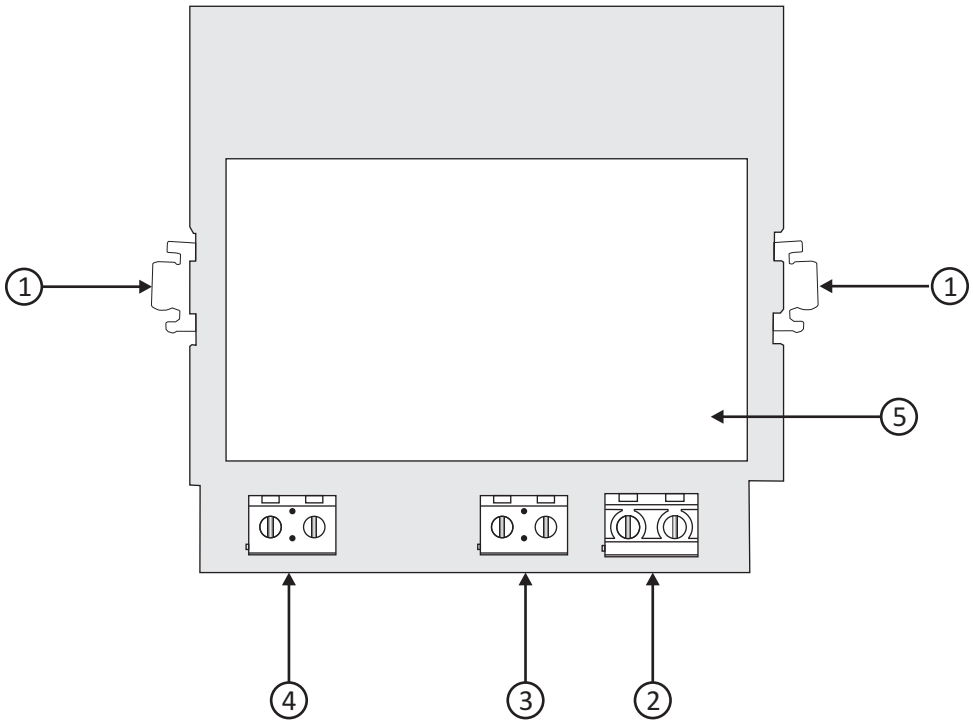
(2) Kilo LED : When this LED is lit, it indicates that the parameter being displayed is in the Kilo range, example Kilo Volts in the case of HT systems.

(3) Parameter Indication LED : When this LED is lit, it indicates that the value being displayed is for the parameter mentioned to the right of the lit LED. For example, if the right most LED is lit, the value displayed is for Frequency (Hz). These LEDs are provided only in Models that display more than one parameter. Refer para 7.

(4) Smart Key. In Models displaying more than one parameter, a short press of this key toggles between the Scroll / Hold modes. A long press of this key takes the Unit into the Menu Mode. Refer paras 8 and 9.

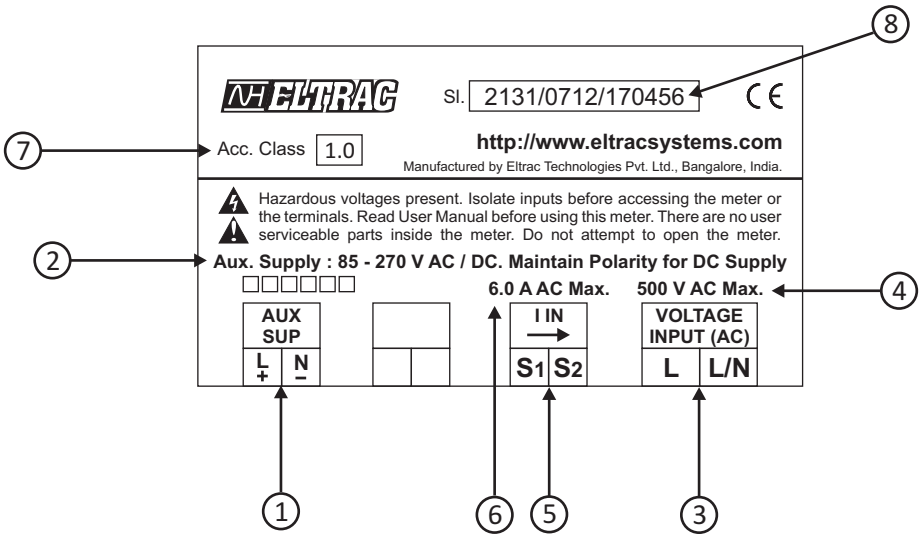
(5) Model Number of the Unit.

3.2. Rear view of your Unit



1. Side Clamps - Refer para 2.2.
2. Voltage Input Terminals - refer para 4.3.5.
3. Current Input Terminals - refer para 4.3.6.
4. Auxiliary Supply Terminals - refer para 4.4.
5. Rear Panel Label. This labels provides all information such identification of the terminals, ratings for the voltage, current and auxiliary supply input, serial number of the unit etc. Refer to para 3.3. below.

3.3. Rear Panel Label



1. Terminal markings for connecting the Auxiliary Supply. Refer para 4.4.
2. Voltage Input range for the Auxiliary Supply.
3. Terminal markings for Voltage Input range.
4. Voltage Input range.
5. Terminal markings for Current Input.
6. Current Input range.
7. Accuracy Class identification
8. Serial Number of the Unit.

4. INSTALLATION

4.1. This chapter covers :

a) Mounting the Unit in the Panel;
b) Wiring the Unit; and
c) Initial Set-up, Programming and Configuration of the Unit.

4.2. MOUNTING THE UNIT

To mount the Unit in the Panel :

4.2.1. Remove the side clamps by pulling the rear end of each clamp outward till it disengages from the case, then pulling it back (keeping it disengaged) till it slides out of the case.

4.2.2. Insert the Unit into the Panel cut-out from the front so that the bezel rests against the Panel. The Panel cut-out needs to be of size 90 +1 -0 x 90+1-0 mm. This will ensure that the Unit sits snugly in the cut-out and the side clamps will grip the Panel and hold the Unit in position.

4.2.3. If the cut-out is smaller, the Unit will not fit into the cut-out. Forcing it can damage the Unit, especially the teeth on either side that lock and hold the side clamps. If the cut-out is bigger, there will not be sufficient space for the side clamps to grip the panel wall and can result in the Unit hanging loosely in the panel and become a safety hazard.

4.2.4. Insert each clamp from the rear end, making sure that both the lower and upper wedges of the clamp go into the triangular slot of the case. Holding the bezel against the Panel, push the clamp forward until you hear the “click” sound of the teeth in the side clamp engaging with the teeth in the case and the Unit is firmly held against the panel.

4.2.5. Repeat step 4.2.4. for the other side clamp.

CAUTION

If the clamp is not correctly inserted, there is a danger of the Unit falling out of the panel. If you are not sure of the procedure, try removing and inserting the side clamps before mounting the meter on the panel.

4.3. WIRING THE MEASUREMENT CONNECTIONS

4.3.1. The inputs to be connected to the Unit are clearly indicated on the Rear Panel. ELTRAC recommends that a pin type lug be crimped to the cable for better grip and connection. Appendix - A provides the wiring diagrams for connecting the measurement connections.

4.3.2. The accuracy of measurement is determined by the accuracy and phase-shift of the PTs and CTs. Instrument Class 1 or better PTs and CTs commensurate with the accuracy class of the Meters are recommended. Do not use Protection Class CTs. They have poor accuracy and phase characteristics that can increase the inaccuracies in measurement. Ensure that the CT primary rating has been selected so that your normal load variation lies between 40% to 80% of its full scale. If your CT is over-rated, and say only 3% to 10% of its full scale is utilized,

accuracy suffers. On the other hand, if your CT is under rated you may exceed the full scale of the CT and burn out both the CT and the Unit.

4.3.3. PT and CT Secondaries must be grounded for safety.

4.3.4. The CT must have adequate VA rating to support the burden (loading) on the secondary on account of the number of instruments that are connected to the CT and the length of the wire from the secondary terminal to the termination on the instruments. Overburdening a CT can result in large measurement errors.

4.3.5. Models ET-2111, ET-2114, ET-2115, ET-2121 and ET-2131 require the voltage input to be connected to the Unit. Model ET-2116 requires the voltage input to be connected if the Unit has been configured as a Voltmeter. For LT systems, the connection can be either Line and Line (415 V AC L-L nominal) or Line and Neutral (240 V AC L-N nominal). In cases where the Line and Neutral are being connected, ensure that the Neutral is connected to the voltage input terminal marked L/N. Connect the voltage inputs directly to the terminals. For HT systems, the inputs should be from the secondary of the Potential Transformer.

4.3.6. Models ET-2212, ET-2214 and ET-2271 require the current inputs to be connected to Unit. Model ET-2116 requires the current input to be connected if the Unit has been configured as an Ammeter. The input should be from the Secondary terminals of the CT. It is important to maintain the direction of the current flow from S1 to S2. While a reversal would not affect the readings or their accuracy, it is not advisable to leave a reversal of current flow uncorrected.

4.4. WIRE THE POWER SUPPLY

4.4.1. Verify that the Auxiliary Supply rating marked on the Rear Panel of the Unit matches the auxiliary supply voltage intended to be connected to the Unit. Also ensure that the supply being connected is within the range marked on the Rear Panel of the Unit.

4.4.2. If the supply is from an AC source, connect Line to the 'L/+' terminal and the Neutral to the 'N/-' terminal.

4.4.3. If the supply is from a DC source, connect the positive side to the terminal 'L/+' and the negative to the terminal 'N/-'. If the connections are reversed, the Unit will not power up.

4.4.4. This completes the installation of the Unit.

	CAUTION
⚠	For reliable operation, establish input connections through pin type lugs crimped to the wire ends. Tighten terminal screws so that the connections are firm. Overtightening may damage the threads.

5. INITIAL SET-UP

5.1. The Unit would have been despatched from the factory with the following default configuration :

5.1.1. In case of Voltmeters, 415 V Line to Line nominal.

5.1.2. In the case of Ammeters, CT ratio of 5 A / 5 A.

5.1.3. Password 100.

5.2. Check the ratings of the electrical system on which the Unit is being installed.

5.2.1. CT Ratio (CtP) : All ELTRAC meters are CT operated unless otherwise marked specifically on the Rear Panel Label. To ensure correct computation of the parameters, the primary value of the Current Transformer needs to be programmed. If the primary value of the CT supplying the current input to the Unit is not 5 Amps, you need to change this setting. Refer to Appendix - E for the procedure.

5.2.2. PT Ratio (PtP) : If your Unit is for use on a HT system, the voltage inputs will be from the secondary of the Potential Transformer. In this case, you need to configure the Voltage Input setting as HT and program the primary value of the PT. Refer to Appendix - D for the procedure.

5.2.3. Password : See para 6 for more details.

5.3. This completes the initial set-up of the Unit.

5.4. Model ET 2116 can be configured either as a Voltmeter or as an Ammeter by the User. Prior to checking the system settings, the User needs to select this Model either as a Voltmeter or an Ammeter. The procedure for this selection is given in Appendix - F.

5.5. Models ET 2114 and ET 2115 display parameters based on the line frequency. These models do not require the voltage input range to be set. Ensure that the Voltage Input range is within the limits that are displayed on the rear panel label of the Unit.

5.6. When the Unit is powered up, it displays Eltrac scrolling from right to left. After that the Unit will display the model number of the Unit. The Unit then goes into the Run Mode and will display the readings.

6. PASSWORD

6.1. All Edit functions in the Unit are password protected. The use of a password is to ensure that the settings are inadvertently changed and to prevent tampering of the settings by unauthorised personnel. The unit has been shipped with a default password of 100. In case the User requires the password to be kept confidential, the password can be edited to a 3 digit numeric password chosen by the User. The procedure for changing the password is provided in the Programming Guide relevant to your model number (Refer Appendices D to G).

6.2. In the event that the default password has been modified and the set password has been forgotten, the editing / modification of the settings cannot be accessed. In such a situation, a responsible representative of the user organisation can request Eltrac for a master password. Such a request must be sent in the format prescribed in Appendix -L.

7. PARAMETER DISPLAY

7.1. All ELTRAC Meters identify the parameter for which the reading being displayed. In models that display only one parameter, the parameter is marked on the front panel of the Unit.

7.2. In models that display more than one parameter, the parameter being displayed is identified by the lit LED next to the parameter marked on the front panel of the Unit.

8. SCROLL / HOLD FACILTY

8.1. All models that display more than one parameter have a Scroll / Hold facility. The Scroll Mode is the default mode when the Unit is powered on. In the Scroll Mode, the Unit automatically advances to the next parameter every six seconds. The Hold Mode disables the Scroll Mode and allows any parameter to be monitored continuously.

8.2. The Enter key enables the toggling between the Scroll and Hold Mode. A short press of the Enter key will take the Unit from the Scroll Mode to the Hold Mode. A second short press of the Enter key will return the Unit back to the Scroll Mode. Return to the Scroll Mode is confirmed by the Unit advancing to the next parameter.

9. KEY OPERATING CONVENTIONS

9.1. The Nano Series of meters are provided with a single Smart key.

9.2. In the Run Mode (the state where the Unit is displaying the parameter readings), a short press of the Smart key toggles the Unit between the Scroll and Hold Modes in models displaying two or more parameters, such as ET-2121 and ET-2131 in the Nano AC range.

9.3. Keeping the Smart key depressed for more than three seconds, takes the Unit into the Menu Mode. In this mode, the User can edit the voltage setting, the current setting and the password as applicable for a particular model.

9.4. In the Menu Mode, the meter advances from one menu option to the next menu option once every six seconds. Pressing the Smart key selects the menu option currently being displayed. If no menu option is selected, the meter returns to the Run Mode after displaying all the menu options for that level.

9.5. Every time that the Unit exits from the Menu Mode, the Unit will reinitialise to update the settings that may have been changed / modified. During the reinitialisation, the Unit will display ELtrAC scrolling from right to left and then display of the model number. Thereafter the Unit will display the readings. If the Voltage and/or Current Input settings were modified, the display of the readings will be based on the modified settings.

APPENDIX - A

WIRING DIAGRAMS

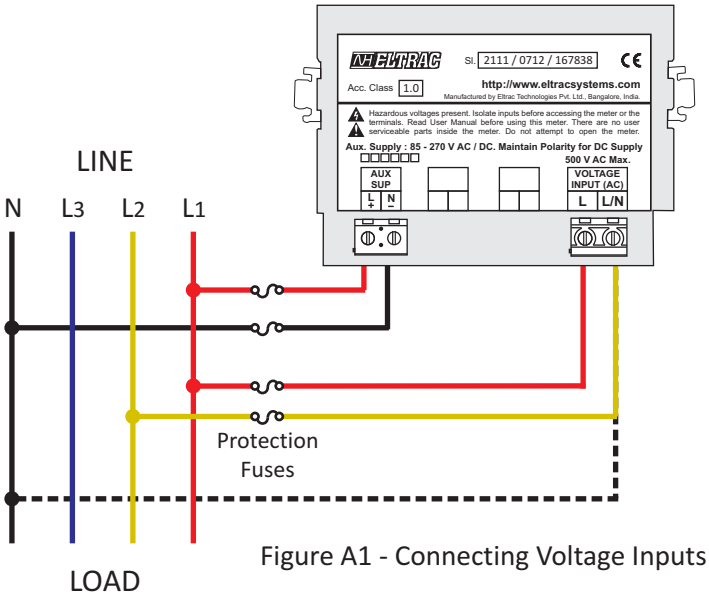

LINE
N
L3
L2
L1
Sl. 2111 / 0712 / 167838
Acc. Class 1.0
http://www.eltracsystems.com
Manufactured by Eltrac Technologies Pvt. Ltd., Bangalore, India.
Hazardous voltages present. Isolate inputs before accessing the meter or the terminals. Read User Manual before using this meter. There are no user serviceable parts inside the meter. Do not attempt to open the meter.
Aux. Supply : 85 - 270 V AC / DC. Maintain Polarity for DC Supply
500 V AC Max.
AUX SUP
L
N
VOLTAGE INPUT (AC)
L
L/N
Protection Fuses
LOAD

Figure A1 - Connecting Voltage Inputs directly

The connection to L/N terminal of the meter can either be the neutral (in case Line-Neutral Voltage is to be measured) or one of the other phases (in case Line-Line voltage is to be measured). In the former option , the connection of the Neutral has been represented by the dotted line. In the latter case, any two of the three phases may be connected. The diagram here depicts connection of the L1 and L2 phases.

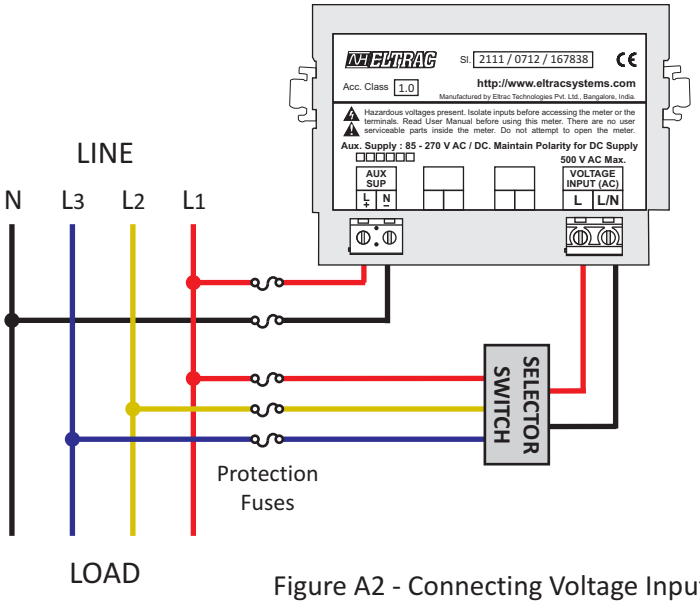

LINE
N
L3
L2
L1
Sl. 2111 / 0712 / 167838
Acc. Class 1.0
http://www.eltracsystems.com
Manufactured by Eltrac Technologies Pvt. Ltd., Bangalore, India.
Hazardous voltages present. Isolate inputs before accessing the meter or the terminals. Read User Manual before using this meter. There are no user serviceable parts inside the meter. Do not attempt to open the meter.
Aux. Supply : 85 - 270 V AC / DC. Maintain Polarity for DC Supply
500 V AC Max.
AUX SUP
L
N
VOLTAGE INPUT (AC)
L
L/N
SELECTOR SWITCH
Protection Fuses
LOAD

Figure A2 - Connecting Voltage Inputs using an external Selector Switch

(Applicable for Models ET 2111, ET 2114, ET 2115 and ET 2116, if it has been configured as an Ammeter)

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Wiring Diagram for Voltage Input for Nano AC Series of Meters for an LT (Low Voltage) Installation	Date: 20.12.2012
	Rev. No : 1.0
Prepared by : Anand V. Hattangady	Scale : Not to Scale
Approved by : H. Vasanth Rao	All dimensions are in mm

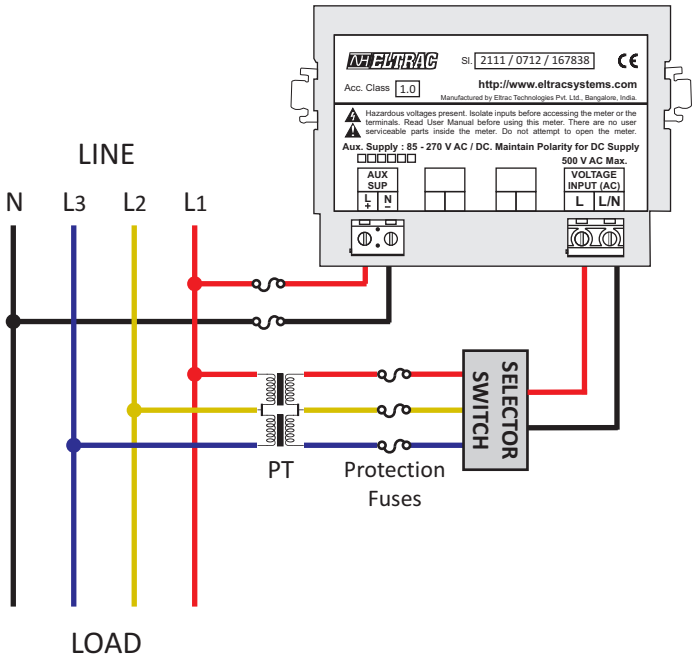

Figure A3 - Connecting Voltage Inputs from the Secondary of a PT in an HT Installation
(applicable for Models ET 2111, ET 2114 and ET 2116, if it has been configured as a Voltmeter)

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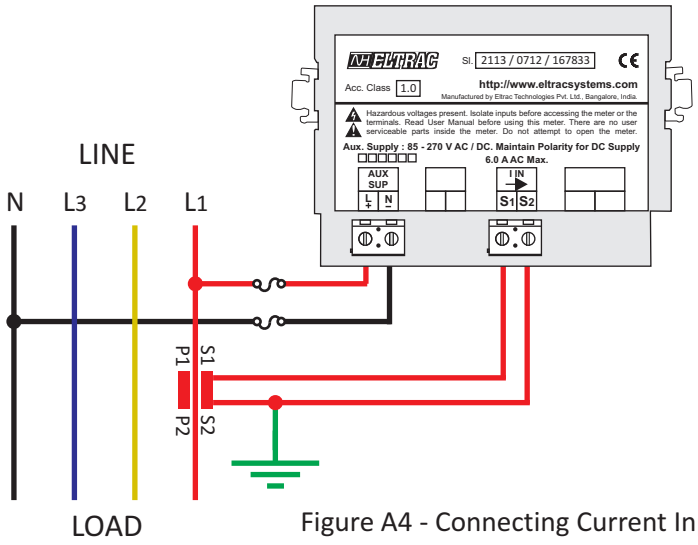
Wiring Diagram for Voltage Input for Nano AC Series of Meters for an HT (High Voltage) Installation	Date: 20.12.2012
	Rev. No : 1.0
Prepared by : Anand V. Hattangady	Scale : Not to Scale
Approved by : H. Vasanth Rao	All dimensions are in mm



The connection to Current Input terminals can be from any phase. The diagram here depicts connection of the L1 phase.

Figure A4 - Connecting Current Input directly

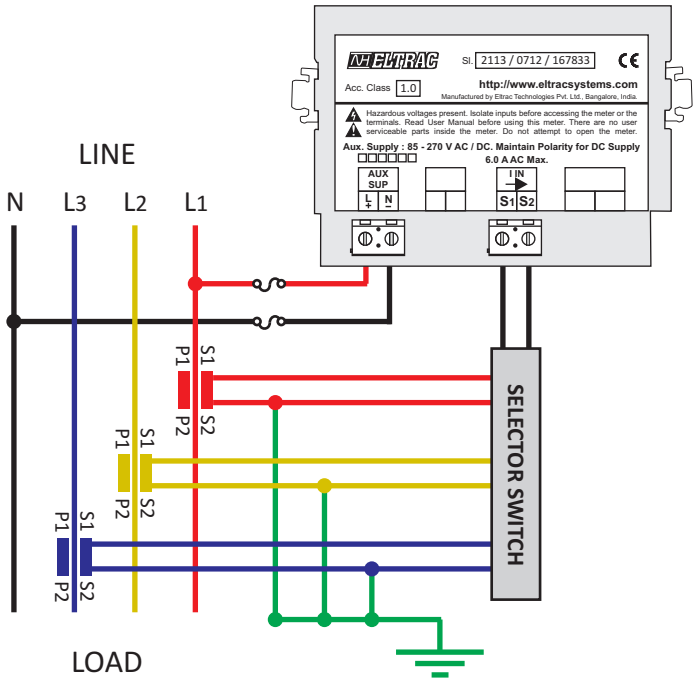


Figure A5 - Connecting Current Inputs using an external Selector Switch

(Applicable for Model ET 2113)

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Wiring Diagram for Current Input for Nano AC Series of Meters.	Date: 20.12.2012
	Rev. No : 1.0
Prepared by : Anand V. Hattangady	Scale : Not to Scale
Approved by : H. Vasanth Rao	All dimensions are in mm

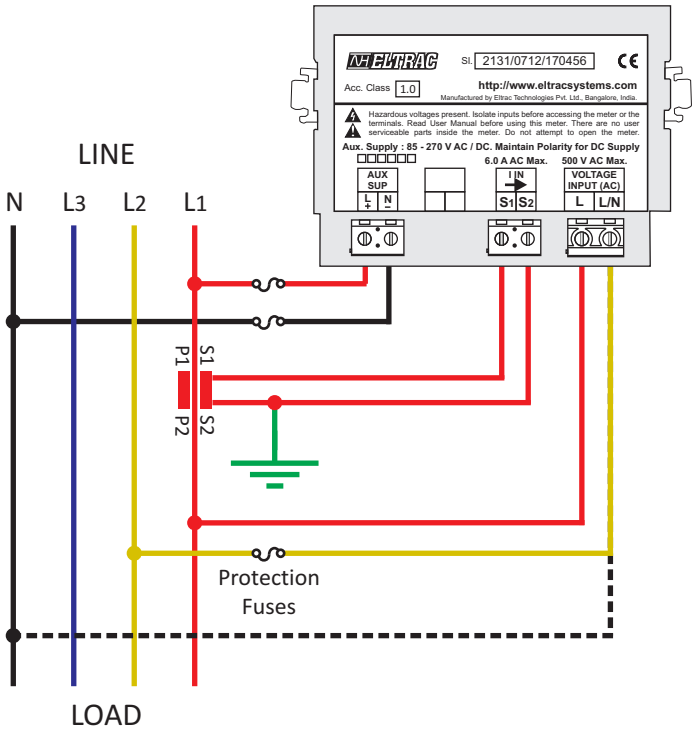

Figure A6 - Connecting Voltage and Current Inputs directly
(applicable for Models ET 2121 and ET 2131)

The connection to L/N terminal of the meter can either be the neutral (in case Line-Neutral Voltage is to be measured) or one of the other phases (in case Line-Line voltage is to be measured). In the former option , the connection of the Neutral has been represented by the dotted line. In the latter case, any two of the three phases may be connected. The diagram here depicts connection of the L1 and L2 phases.

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Wiring Diagram for Voltage and Current Inputs for Nano AC Series of Meters directly	Date: 20.12.2012
	Rev. No : 1.0
Prepared by : Anand V. Hattangady	Scale : Not to Scale
Approved by : H. Vasanth Rao	All dimensions are in mm

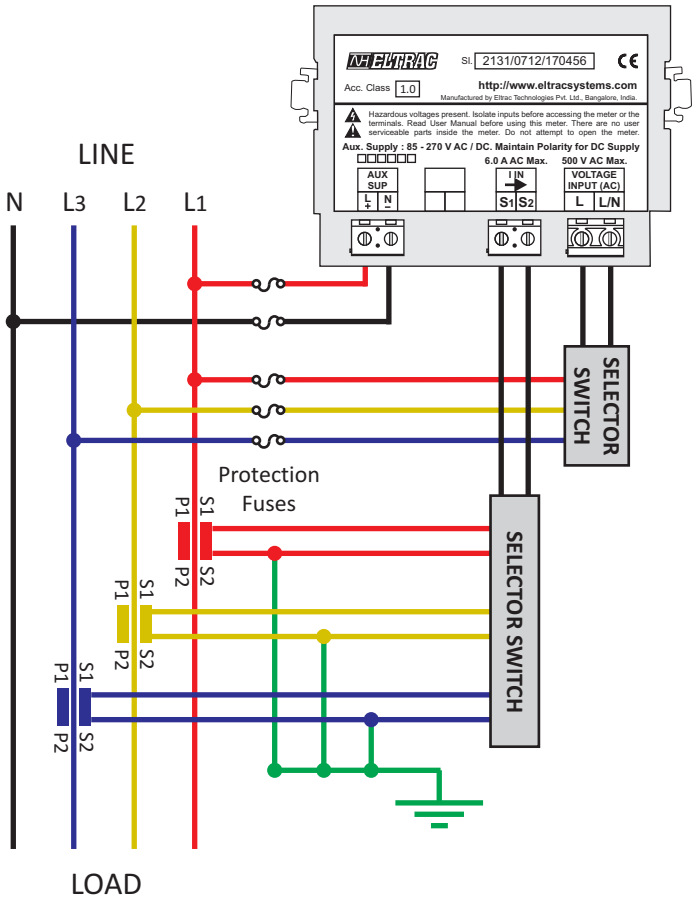

Figure A7 - Connecting Voltage and Current Inputs using an external Selector Switch (applicable for Models ET 2121 and ET 2131)

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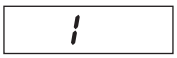
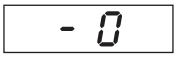
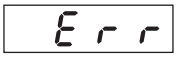
Wiring Diagram for Voltage and Current Inputs for Nano AC Series of Meters using an external Selector Switch	Date: 20.12.2012
	Rev. No : 1.0
	Scale : Not to Scale
	All dimensions are in mm

APPENDIX - B

PASSWORD ENTRY

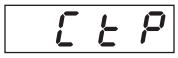
All Edit functions are password protected to guard against unauthorised changes and tampering of the settings. The Unit will have been setup with a Password of 100 at the time of despatch from the factory. The entry of the password starts with the display showing “PW” as in the display at step A1 below. This indicates that the password is required to be entered. The procedure for entering the password, the default password 100 in this example, is explained below. The User is free to change this password to any 3 digit password of his choice. The procedure to change the password is explained in Appendix - D.

STEP	DISPLAY	KEY	COMMENT
A1			Indicates that a password is required to be entered.
A2			After 6 seconds, the display will change. The second digit from the left will display 0. This digit will automatically increment once every 2 seconds from 0 through 9 returning again to 0. If a digit is not selected for a period of one minute, the meter will then return to the Run Mode.
A3		ENTER ↓3 sec	Press the ENTER key when the display is 1
A4		ENTER ↓3 sec	The first digit selected changes to a “dash”. Password digits already entered are displayed as “-” for security reasons. The digit to the right of the first digit starts with 0 and automatically increments. Press the ENTER key when the digit displays 0. advances to step A5.
A5		ENTER ↓3 sec	The second digit selected changes to a “dash”. The digit to the right of the second digit starts with 0 and automatically increments. Press the ENTER key when the digit displays 0. Completes entry of the password.
			If the entry of the password was successful, you will proceed to the next step in the sequence.
			If the entry of the password was not successful, i.e. a wrong password was used, the meter will display an error message and return to the run mode.

APPENDIX - C

ENTRY OF NUMERALS

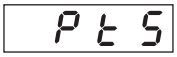
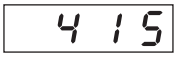
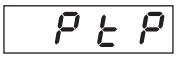
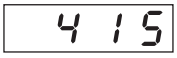
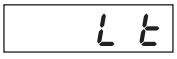
All ELTRAC meters can be field configured for any electrical system. The Voltage Input can be configured for LT (415 V Line - Line) or HT systems. In the case of HT, the User can program the Primary and Secondary value. Similarly, the Current Input can be configured for CT Secondary of 1 Amp or 5 Amps (in the case of CT operated models). The User can program the Primary value of the CT. The CT Primary value has to entered as a 4 digit numeral. Accordingly, a CT Primary value of 50 Amps would have to be entered as 0050, a Primary value of 500 Amps would have to entered as 0500, and so on. The procedure to program the Primary value of the CT, to say 250 Amps in this example, is explained below.

STEP	DISPLAY	KEY	COMMENT
B1			Indicates that a CT Primary value is required to be entered.
B2		ENTER ↓3 sec	After 6 seconds, the display will change to “0000”. This is the start of the entry. The left most digit will start at 0 and increment automatically once every 6 seconds. Press the ENTER key when the digit is 0. Advances to step B3.
B3		ENTER ↓3 sec	After 6 seconds, the display will change to “0000”. This is the start of the entry. The left most digit will start at 0 and increment automatically once every 2 seconds. Press the ENTER key when the digit is 0. Advances to step B4.
B4		ENTER ↓3 sec	The second digit from the left now starts incrementing automatically. Press the ENTER key the digit is 2. Advances to step B5.
B5		ENTER ↓3 sec	On selection of the second digit from the left, the third digit starts automatically incrementing. Press the ENTER key the digit is 5. Advances to step B6.
B6		ENTER ↓3 sec	On selection of the third digit from the left, the fourth digit starts incrementing automatically. Press the ENTER key the digit is 0. This completes the entry of the CT Primary value of 250 Amps.

APPENDIX - D

PROGRAMMING GUIDE - ET 2111 VOLTMETER

voltmeter Model ET 2111 can be field configured for any electrical system. The Voltage Input can be configured for LT (415 V Line - Line) or HT systems. In the case of HT, the User can program the Primary and Secondary value. The programming sequence is explained below. Holding the ENTER key pressed for around 3 seconds takes the meter into the Menu Mode. Entry into the Menu Mode starts with the display as at C1 below.

STEP	DISPLAY	KEY	COMMENT
C1			Indicates that the meter is now in the Menu Mode. The meter first displays the existing settings. PTS stands for the PT Secondary value. After 4 seconds advances to Step C2.
C2			Displays the PT Secondary value, 415 V in this example. After 6 seconds, advances to Step C3.
C3			Indicates that the PT Primary value will be displayed next. After 4 seconds, advances to Step C4.
C4			Displays the value of the PT Primary value, 415 V in this example. This means that the meter has been configured to monitor a low voltage system of 415 V Line to Line. After 6 seconds, advances to Step C5.
C5		ENTER ↓3 sec	Displays the first menu item, Edit PT. To edit the voltage input settings, press the ENTER key. If no key is pressed, advances to the next menu option at Step C17 after 4 seconds.
C6			Editing of the Voltage Input settings is password protected. This display indicates that the User will be required to enter the password. After 4 seconds, advances to Step C7.
C7		ENTER ↓3 sec	Proceed with the entry of the password as explained in Appendix B. Advances to Step C8.
C8		ENTER ↓3 sec	Allows setting of the voltage input as Low Voltage, i.e., 415 Volts Line to Line. Press ENTER to select this setting. Advances to Step C9. If no key is pressed, after 4 seconds, advances to the next menu option at Step C10.
C9			Indicates that the Voltage Setting has been set to Low Voltage 415 Volts Line to Line. The meter then reinitialises to update the new settings and returns to the Run Mode.

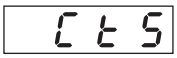
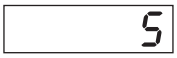
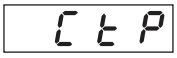
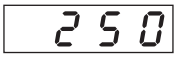
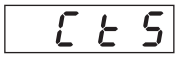
STEP	DISPLAY	KEY	COMMENT
C10	PE	ENTER ↓3 sec	Allows setting of the Voltage Input as High Voltage. Press ENTER to select this setting. Advances to Step C11. If no key is pressed, the Unit will return to the Run Mode after 6 seconds.
C11	415	ENTER ↓3 sec	Allows setting of the Voltage Input Secondary value as 415 Volts. Press ENTER to select this setting. Advances to Step C12. If no key is pressed, advances to the next menu option at Step C14.
C12	0000	ENTER ↓3 sec	Start entry of the numerals for the Primary value of the Voltage Input as per the procedure set out in Appendix - B. Advances to Step C13.
C13	0750	ENTER ↓3 sec	Completes entry of the Voltage Input Primary value, say 750 Volts in this example. The Unit will reinitialise and return to the Run Mode.
C14	110	ENTER ↓3 sec	Allows setting of the Voltage Input Secondary value as 110 Volts. This is normally the output from a PT Secondary. Press ENTER to select this option. Advances to Step C15. If no key is pressed, the Unit will return to the Run Mode after 6 seconds.
C15	1.10	ENTER ↓3 sec	Allows selection of the PT Primary value. The display scrolls through the range of PT values, every 2 seconds - 1.10 kV, 2.20 kV, 3.30 kV, 6.60 kV, 11.0 kV, 22.0 kV, 33.0 kV, 66.0 kV, 132 kV, 220 kV, 415 V, 440 V, 500 V. Press ENTER when the required PT Primary value is displayed. Advances to Step C16. If none of these values are selected, the Unit will return to the Run Mode.
C16	don	ENTER ↓3 sec	Confirms the settings of the PT Primary value, 1.10 kV in this example. After 4 seconds, returns to the Run Mode.
C17	EPd	ENTER ↓3 sec	Allows setting of the password. Press ENTER to select this option. Advances to Step C18. If no key is pressed, the Unit returns to the Run Mode after 4 seconds.
C18	PUd		Indicates that the password is required to be entered next. After 6 seconds, advances to Step C19.
C19	0	ENTER ↓3 sec	Start the entry of the password numerals as per the procedure given in Appendix - B. Advances to Step C20.

STEP	DISPLAY	KEY	COMMENT
C20	- - 0	ENTER ↓3 sec	Complete entry of the password. Advances to Step C21.
C21	0	ENTER ↓3 sec	Start entry of the new password. The password should of 3 digit numeral. The procedure for the entry of the password is provided in Appendix - B. Advances to Step C22.
C22	- - 0	ENTER ↓3 sec	Complete entry of the new password. Advances to Step C23.
C23	don		Confirms that the new password has been set. From this point onwards, only the new password can be used. Using the old password will result in an Error (Err) message. After 6 seconds, the Unit returns to the Run Mode.

APPENDIX - E

PROGRAMMING GUIDE - ET 2113 AMMETER

Ammeter Model ET 2113 is a CT operated meter. The Current Input to the Unit should be from the Secondary terminals of a CT. The Unit can be field configured for a CT Secondary output of 1 Amp or 5 Amps. The Primary value of the CT can be programmed. The programming sequence is explained below. Holding the ENTER key pressed for around 3 seconds takes the meter into the Menu Mode. Entry into the Menu Mode starts with the display as at D1 below.

STEP	DISPLAY	KEY	COMMENT
D1			Indicates that the meter is now in the Menu Mode. The meter first displays the existing settings. CTS stands for the CT Secondary value. After 4 seconds advances to Step D2.
D2			Displays the CT Secondary value, 5 Amps in this example. After 6 seconds, advances to Step D3.
D3			Indicates that the CT Primary value will be displayed next. After 4 seconds, advances to Step D4.
D4			Displays the value of the PT Primary value, 250 A in this example. This means that the meter has been configured for a CT Ratio of 250 A / 5 A. After 6 seconds, advances to Step D5.
D5		ENTER ↓3 sec	Displays the first menu item, Edit CT. To edit the current input settings, press the ENTER key. If no key is pressed, advances to the next menu option at Step D18 after 4 seconds.
D6			Editing of the Current Input settings is password protected. This display indicates that the User will be required to enter the password. After 4 seconds, advances to Step D7.
D7		ENTER ↓3 sec	Proceed with the entry of the password numerals as explained in Appendix - B. Advances to Step D8.
D8			Indicates that the CT Secondary value is to be set up next. After 4 seconds, advances to Step D9.
D9		ENTER ↓3 sec	Press ENTER to select the CT Secondary value of 1 A. Advances to Step D10. If no key is pressed, advances to Step D14 after 6 seconds.

STEP	DISPLAY	KEY	COMMENT
D10	CtP		Indicates that the CT Primary value is to be entered next. Advances to Step D11 after 4 seconds.
D11	0000	ENTER ↓3 sec	Start entry of the CT Primary value as per the procedure given in Appendix - C. Advances to Step D12.
D12	0200	ENTER ↓3 sec	Complete entry of the CT Primary value, 200 Amps in this example as per the procedure given in Appendix - C. Advances to Step D13.
D13	don		Confirms setting of the Current Input Secondary and Primary values. After 6 seconds, the Unit re-initialises and returns to the Run Mode.
D14	5A	ENTER ↓3 sec	Press ENTER to select CT Secondary value of 5 Amps. Advances to Step D15. If no key is pressed, the Unit returns to the Run Mode after 6 seconds.
D15	0000	ENTER ↓3 sec	Start entry of the CT Primary value as per the procedure given in Appendix - C. Advances to Step D16.
D16	0200	ENTER ↓3 sec	Complete entry of the CT Primary value, 200 Amps in this example as per the procedure given in Appendix - C. Advances to Step D17.
D17	don		Confirms setting of the Current Input Secondary and Primary values. After 6 seconds, the Unit re-initialises and returns to the Run Mode.
D18	EPd	ENTER ↓3 sec	Allows setting of the password. Press ENTER to select this option. Advances to Step D19. If no key is pressed, the Unit returns to the Run Mode after 6 seconds.
D19	PUd		Indicates that the password is required to be entered next. After 6 seconds, advances to Step D20.
D20	0	ENTER ↓3 sec	Start the entry of the password as per the procedure given in Appendix - B. Advances to Step D21.

STEP	DISPLAY	KEY	COMMENT
D21	- - 0	ENTER ↓3 sec	Complete entry of the password. Advances to Step D22.
D22	0	ENTER ↓3 sec	Start entry of the new password. The password should of 3 digit numeral. The procedure for the entry of the password is provided in Appendix - B. Advances to Step D23.
D23	- - 0	ENTER ↓3 sec	Complete entry of the new password. Advances to Step D24.
D24	don		Confirms that the new password has been set. From this point onwards, only the new password can be used. Using the old password will result in an Error (Err) message. After 6 seconds, the Unit returns to the Run Mode.

APPENDIX - F

PROGRAMMING GUIDE - ET 2116

FIELD CONFIGURABLE AS VOLTMETER OR AMMETER

ELTRAC Model ET 2116 is field configurable as a Voltmeter or an Ammeter. On power on, the display will toggle between “VoL” and “CUr” until one of the options is selected. Pressing the ENTER key when the display is “VoL” will configure the Unit as a Voltmeter. Similarly, pressing the ENTER key when the display is “CUr” will configure the Unit as an Ammeter. **CAUTION**: **Once the Unit is configured either as a Voltmeter or an Ammeter, it cannot be changed**.

STEP	DISPLAY	KEY	COMMENT
E1			Press ENTER to configure the Unit as a Voltmeter. On pressing ENTER, the Unit will initialise itself as Voltmeter and go into the Run Mode. The Voltage Input settings will be the default settings mentioned in para 5.1. If not key is pressed, advances to Step E2 after 4 seconds.
E2			Press ENTER to configure the Unit as an Ammeter. On pressing ENTER, the Unit will initialise itself as an Ammeter and go into the Run Mode. The Current Input settings will be the default settings mentioned in para 5.1. If not key is pressed, returns to Step E1 after 4 seconds.

If the Unit has been configured as a Voltmeter, follow the Programming Guide given at Appendix - D to change or modify the settings.

If the Unit has been configured as an Ammeter, follow the Programming Guide given at Appendix - E to change or modify the settings.

APPENDIX - G

PROGRAMMING GUIDE - MODEL ET 2121 (Voltage, Current) & ET 2131 (Voltage, Current, Frequency)

Model ET 2121 displays Voltage and Current and is essentially a combination of Voltmeter ET 2111 and Ammeter ET 2113. The Voltage Input can be Line-to-Line (415 V AC nominal), Line-to-Neutral (240 V AC nominal) or from the Secondary terminals of a PT (110 V or 415 V nominal). If the input from a PT, the Primary value of the PT can be programmed. The Current Input will be from the Secondary terminals of the CT and can be either 1 A nominal or 5 Amps nominal. The Primary value of the CT can be programmed.

Model ET 2131 is similar to Model ET 2121 with the exception that, it displays the line frequency in addition to Voltage and Current. The programming sequence for both the Models are the same and is explained below.

In both these Models, a short press of the ENTER key toggles the display between the Scroll Mode and Hold Mode. Holding the ENTER key pressed for around 3 seconds takes the Unit into the Menu Mode. Entry into the Menu Mode starts with the display as at E1 below.

STEP	DISPLAY	KEY	COMMENT
E1	CtS		Indicates that the meter is now in the Menu Mode. The meter first displays the existing settings. CTS stands for the CT Secondary value. After 6 seconds advances to Step E2.
E2	5		Displays the CT Secondary value, 5 Amps in this example. After 6 seconds, advances to Step E3.
E3	CtP		Indicates that the CT Primary value will be displayed next. After 6 seconds, advances to Step E4.
E4	250		Displays the value of the PT Primary value, 250 A in this example. This means that the meter has been configured for a CT Ratio of 250 A / 5 A. After 6 seconds, advances to Step E5.
E5	PtS		Displays the Voltage Input settings. PTS stands for the PT Secondary value. After 6 seconds advances to Step E6.
E6	415		Displays the PT Secondary value, 415 V in this example. After 6 seconds, advances to Step E7.
E7	PtP		Indicates that the PT Primary value will be displayed next. After 6 seconds, advances to Step E8.
E8	415		Displays the value of the PT Primary value, 415 V in this example. This means that the meter has been configured to monitor a low voltage system of 415 V Line to Line. After 6 seconds, advances to Step E9.

STEP	DISPLAY	KEY	COMMENT
E9	ECt	ENTER ↓3 sec	Displays the first menu item, Edit CT. Press the ENTER key to edit the current input settings. Advances to Step E10. If no key is pressed, advances to the next menu option at Step E22 after 6 seconds.
E10	PWd		Editing of the Current Input settings is password protected. This display indicates that the User will be required to enter the password. After 6 seconds, advances to Step E11.
E11	- - 0	ENTER ↓3 sec	Proceed with the entry of the password as explained in Appendix - B. Advances to Step E12.
E12	CtS		Indicates that the CT Secondary value is to be set up next. After 6 seconds, advances to Step E13.
E13	1A	ENTER ↓3 sec	Press ENTER to select the CT Secondary value of 1 A. Advances to Step E14. If no key is pressed, advances to Step E18 after 6 seconds.
E14	CtP		Indicates that the CT Primary value is to be entered next. Advances to Step E15 after 6 seconds.
E15	0000	ENTER ↓3 sec	Start entry of the CT Primary value as per the procedure given in Appendix - C. Advances to Step E16.
E16	0200	ENTER ↓3 sec	Complete entry of the CT Primary value, 200 Amps in this example as per the procedure given in Appendix - C. Advances to Step E17.
E17	don		Confirms setting of the Current Input Secondary and Primary values. After 6 seconds, the Unit re-initialises and returns to the Run Mode.
E18	5A	ENTER ↓3 sec	Press ENTER to select CT Secondary value of 5 Amps. Advances to Step E19. If no key is pressed, the Unit returns to the Run Mode after 6 seconds.
E19	0000	ENTER ↓3 sec	Start entry of the CT Primary value as per the procedure given in Appendix - C. Advances to Step E20.

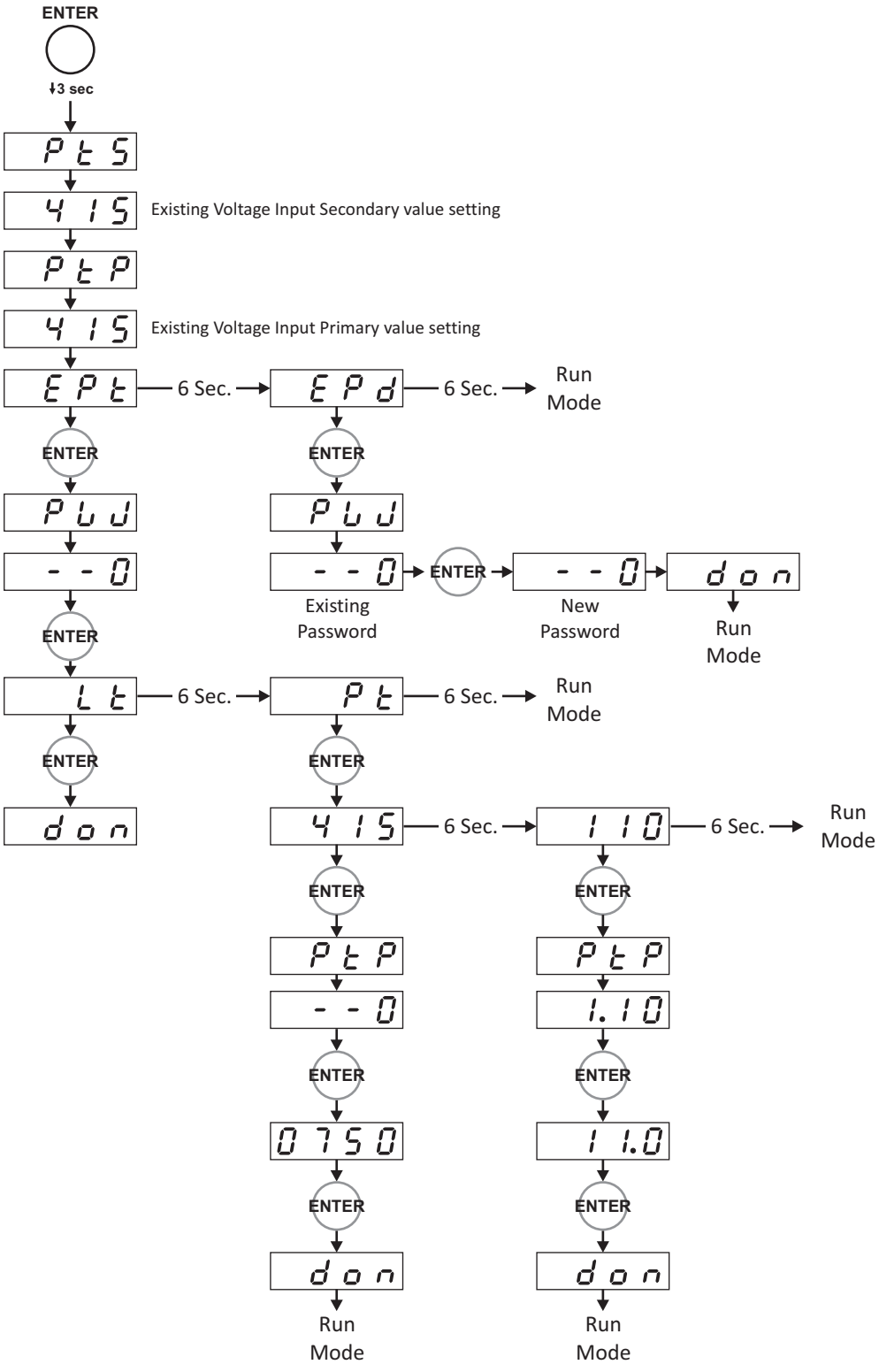
STEP	DISPLAY	KEY	COMMENT
E20	0200	ENTER ↓3 sec	Complete entry of the CT Primary value, 200 Amps in this example as per the procedure given in Appendix - C. Advances to Step E21.
E21	don		Confirms setting of the Current Input Secondary and Primary values. After 6 seconds, the Unit re-initialises and returns to the Run Mode.
E22	EPt	ENTER ↓3 sec	Displays the first menu item, Edit PT. To edit the voltage input settings, press the ENTER key. Advances to Step E23. If no key is pressed, advances to the next menu option at Step E34 after 6 seconds.
E23	PwJ		Editing of the Voltage Input settings is password protected. This display indicates that the User will be required to enter the password. After 6 seconds, advances to Step E24.
E24	- - 0	ENTER ↓3 sec	Proceed with the entry of the password as explained in Appendix B. Advances to Step E25.
E25	Lt	ENTER ↓3 sec	Allows setting of the voltage input as Low Voltage, i.e., 415 Volts Line to Line. Press ENTER to select this setting. Advances to Step E26. If no key is pressed, after 6 seconds, advances to the next menu option at Step E27.
E26	don		Indicates that the Voltage Setting has been set to Low Voltage 415 Volts Line to Line. The meter then reinitialises to update the new settings and returns to the Run Mode.
E27	Pt	ENTER ↓3 sec	Allows setting of the Voltage Input as High Voltage. Press ENTER to select this setting. Advances to Step E28. If no key is pressed, the Unit will return to the Run Mode after 6 seconds.
E28	415	ENTER ↓3 sec	Allows setting of the Voltage Input Secondary value as 415 Volts. Press ENTER to select this setting. Advances to Step E29. If no key is pressed, advances to the next menu option at Step E31.
E29	0000	ENTER ↓3 sec	Start entry of the numerals for the Primary value of the Voltage Input as per the procedure set out in Appendix - B. Advance to Step E30.

STEP	DISPLAY	KEY	COMMENT
E30	0750	ENTER ↓3 sec	Completes entry of the Voltage Input Primary value, say 750 Volts in this example. The Unit will reinitialise and return to the Run Mode.
E31	110	ENTER ↓3 sec	Allows setting of the Voltage Input Secondary value as 110 Volts. This is normally the output from a PT Secondary. Press ENTER to select this option. Advances to Step E32. If no key is pressed, the Unit will return to the Run Mode after 6 seconds.
E32	1.10	ENTER ↓3 sec	Allows selection of the PT Primary value. The display scrolls through the range of PT values, every 6 seconds - 1.10 kV, 2.20 kV, 3.30 kV, 6.60 kV, 11.0 kV, 22.0 kV, 33.0 kV, 66.0 kV, 132 kV, 220 kV, 415 V, 440 V, 500 V. Press ENTER when the required PT Primary is displayed. Advances to Step E33. If none of these values are selected, the Unit will return to the Run Mode.
E33	don	ENTER ↓3 sec	Confirms the settings of the PT Primary value, 1.10 kV in this example. After 6 seconds, returns to the Run Mode.
E34	EPd	ENTER ↓3 sec	Allows setting of the password. Press ENTER to select this option. Advances to Step E35. If no key is pressed, the Unit returns to the Run Mode after 6 seconds.
E35	PUJ		Indicates that the password is required to be entered next. After 6 seconds, advances to Step E36.
E36	0	ENTER ↓3 sec	Start the entry of the password as per the procedure given in Appendix - B. Advances to Step E37.
E37	- - 0	ENTER ↓3 sec	Complete entry of the password. Advances to Step E38.
E38	0	ENTER ↓3 sec	Start entry of the new password. The password should of 3 digit numeral. The procedure for the entry of the password is provided in Appendix - B. Advances to Step E39.
E39	- - 0	ENTER ↓3 sec	Complete entry of the new password. Advances to Step E40.
E40	don		Confirms that the new password has been set. From this point onwards, only the new password can be used. Using the old password will result in an Error (Err) message. After 6 seconds, the Unit returns to the Run Mode.

APPENDIX - H

PROGRAMMING SEQUENCE AT A GLANCE - ET 2111

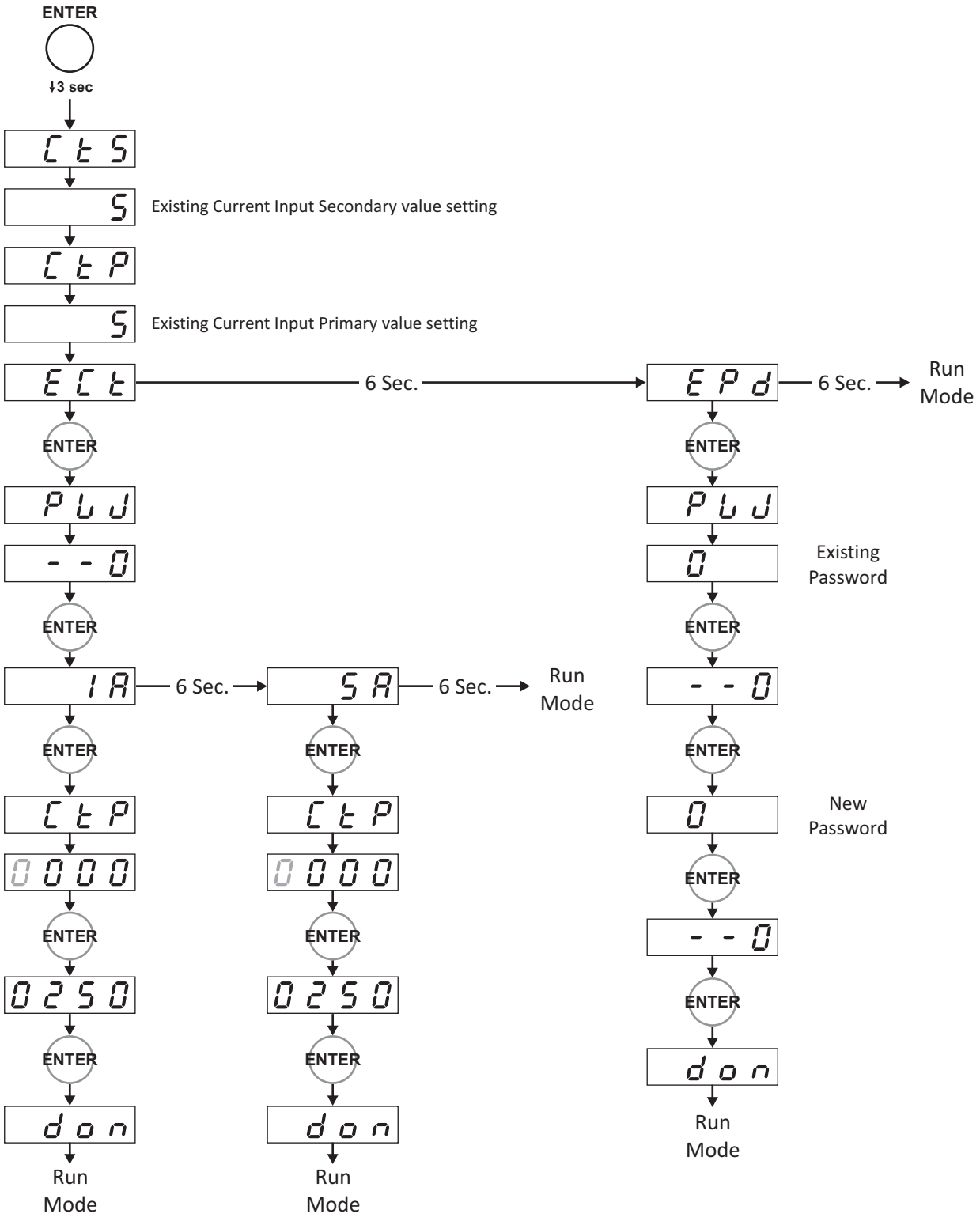
The Programming Sequence for Model ET 2111 is shown below. A more detailed sequence with explanatory comments is available at Appendix - D.



APPENDIX - I

PROGRAMMING SEQUENCE AT A GLANCE - ET 2113

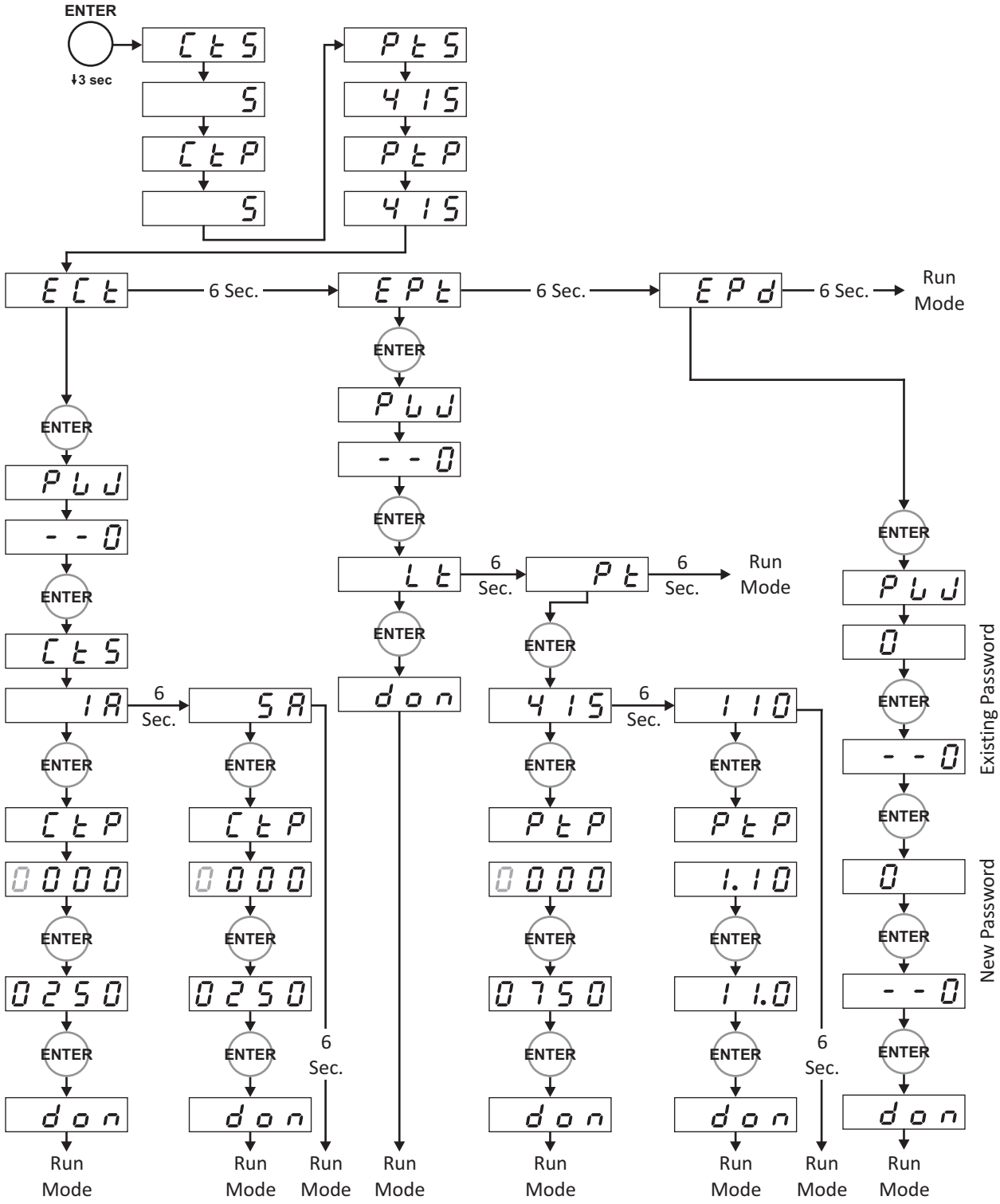
The Programming Sequence for Model ET 2113 is shown below. A more detailed sequence with explanatory comments is available at Appendix - E.



APPENDIX - J

PROGRAMMING SEQUENCE AT A GLANCE - ET 2121 & ET 2131

The Programming Sequence for Model ET 2121 and ET 2131 is identical and is shown below. A more detailed sequence with explanatory comments is available at Appendix - G.



APPENDIX - K

WARRANTY CERTIFICATE

Eltrac Technologies Pvt. Ltd. (ELTRAC) warrants its products to be free from defects in material and workmanship under normal use and service.

The warranty is valid for a period of 15 months following the month of manufacture or 12 months following the month of sale, whichever is earlier.

The warranty is limited to replacement of the defective product when it is returned to an authorised Dealer within the warranty period, at the Dealer's premises. If the product has been discontinued, ELTRAC reserves the option to replace it with a product that it deems closest in function and performance to the returned product.

The warranty shall not apply in the event of damage sustained on account of improper installation, incorrect connection, misuse, abuse, neglect, accident, abnormal operating conditions, war or Acts of God. Disruption of the warranty seal shall automatically invalidate the warranty.ELTRAC retains the sole right of determination under this clause.

ELTRAC authorised Dealers shall extend this warranty on new and unused products to buyers but have no authority to extend a greater or different warranty on behalf of ELTRAC.

This warranty is the buyer's sole and exclusive remedy and is in lieu of all other warranties, express or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. ELTRAC shall not be liable for any special, indirect, incidental or consequential damages or losses, including loss of data, damages or losses arising from the use or application of the product or from the use or application of its output or analysis, whether arising from breach of warranty or based on contract, tort, reliance or any other theory.

Products returned to ELTRAC or its authorised Dealers, if replaced, will become the property of ELTRAC.

APPENDIX - L

FORMAT FOR MASTER PASSWORD REQUEST

Date :

From :

The Service Department
Eltrac Technologies Pvt. Ltd.
No. 63/3-4, P & T Colony Road
Srigandhakaval, Sunkadakatte
Magadi Road
Bangalore - 560091, INDIA

Dear Sirs,

Sub: Request for Master Password

We are the owners of Eltrac Meter Model ET ☐☐☐☐

bearing serial number ☐☐☐☐ / ☐☐☐☐ / ☐☐☐☐☐☐☐

We have misplaced the Password set for the above meter and are unable to access the Edit functions on this meter. We request you to send us the Master Password for this meter. The Master Password may be sent in confidence to the person designated below.

We understand that the responsibility for the security of the passwords, including the Master Password, lies with us and that ELTRAC TECHNOLOGIES PVT. LTD. will in no way be responsible for loss or misuse of the passwords and any incidental or consequential damages arising out of it.

Person Authorised to receive Master Password

Authorised Signatory (with stamp)

Name

Designation

Address

This request duly filled out and signed by the Authorised Signatory can be sent by post / courier to the Eltrac Service Centre or a scanned copy can be mailed to service@eltracsystems.com